

463209

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

March 22, 2002

To: Spectron Site File

From: Robert J. Sanchez, Spectron Remedial Project Manager (RPM)

Subject: Spectron Superfund Site, Elkton, Maryland
Scott G. Huling, EPA - Lactic Acid Substrate Phone Conversation Record

Attendees: Rob Sanchez, Spectron RPM, and
Scott G. Huling, EPA

I called Scott G. Huling of U.S. Environmental Protection Agency's (EPA) Office of Research and Development National Risk Management Research Laboratory, Subsurface Protection and Remediation Division (SPRD) located in Ada, Oklahoma on March 20, 2002. This office of EPA provides research and technical support to EPA and is considered one of EPA's "Think-Tanks."

My purpose for calling Mr. Huling was to have him provide an evaluation of a new feasible alternative that is being considered. The new alternative would be the application of a lactic acid substrate to degrade the contaminants in the shallow soils at the Galaxy/Spectron ("Spectron") Superfund site. I was referred to Mr. Huling by Dominic C. DiGiulio of SPRD since Mr. Huling had additional background history on the used of lactic acid substrate. Mr. Huling's biography is attached to this memorandum.

I briefly described the Spectron site's history, removal actions taken, geology, hydrology, soil conditions, contaminants of concern, etc to Mr. Huling. We discussed many of the specific site conditions such as the low permeability layer and the related perched water table and contaminants. I discussed treating the know contaminants with a lactic acid substrate like molasses or the time released product offered by Regensis called HRC (i.e., Hydrogen Release Compound). I explained that it is envisioned that getting the material down into the shallow soil overburden could be done with either push point injection (e.g., GeoProbe) device or we could convert monitoring wells into application wells. We also considered using a single horizontal well with a packer type system to pump out the material in specific areas along the length of the well.

Mr. Huling said that he is currently involved in sites where lactic acid substrates are being used for treatment of these types of contaminants. He said that he did not see any red flags that this should not be the way to go. However, he pointed out that while this material is capable of treating these contaminants that actually getting the two together would be the larger concern. The effectiveness of the application is site specific and the low permeability layer would provide some obstacle. He agreed that it may be reasonable to apply the material above and below the

low permeability layer. He confirmed that applications applied upgradient (furthest away from the stream) would allow the components of the material to travel across the site treating contaminants and being used up as it approaches the stream. I asked him what would occur if the material or its components somehow may it into the waste water treatment system. He was not sure because he was unfamiliar with the biological treatment design of the waste water treatment system. I asked how the treatment would impact dense non-aqueous phase liquids (DNAPLs). He explained that dense non-aqueous phase liquids (DNAPLs) are high concentrations are the contaminate. He said that DNAPLs if encountered should be removed and described them as "recoverable." Continuing he explained the these high concentration areas continually dissolve into the groundwater that surround them. He called this dissolved phase DNAPLs. The lactic acid substrate can not effectively impact the DNAPL because the DNAPL concentrations are overwhelming; however, in the dissolve phase areas just beyond the concentrated DNAPL the material can treat the dissolve contaminants. As the material removes contaminants in the dissolved phase more of the concentrated DNAPL dissolves inot the water and is also treated by the material. Over time the concentrated DNAPL all dissolves away into the dissolved phase DNAPL. So while the material can not directly impact high concentration of DNAPL it can remove it by working on the fringes of the high concentration.

Mr. Huling felt that some other materials could be utilized to treat contamination such as magnesium permanate



Office of Research and Development
National Risk Management Research Laboratory
**Subsurface Protection and
Remediation Division**
P.O. Box 1198 Ada, Oklahoma 74820
(580) 436-8500

Biography

Scott G. Huling is an Environmental Engineer in SPRD's Technical Assistance and Technology Transfer Branch. He has a B.S. in Environmental Science from the University of Texas at San Antonio, a M.S. in Environmental Engineering from the University of Texas at Austin, and a Ph.D. in Environmental Engineering from the Department of Chemical and Environmental Engineering at the University of Arizona at Tucson. He is a professional engineer and registered with the Oklahoma State Board of Registration. Dr. Huling has been employed by the U.S. Environmental Protection Agency, Robert S. Kerr Environmental Research Center since 1987.

Site Specific Technical Support - Dr. Huling provides site specific technical support to EPA Regional and Headquarter staff regarding ground water and soils. Technical issues include subsurface fate and transport of contaminants, chemical oxidation, remediation, LNAPLs/DNAPLs, natural attenuation, site characterization, bioremediation/land treatment, technical impracticability, and treatability studies.

Research - His current research focus involves Fenton- based oxidation systems involving H_2O_2 and Fe. Laboratory studies involving batch and column reactors are conducted to investigate techniques to enhance $\bullet OH$ production, oxidation efficiency and reaction kinetics. Oxidation parameters are optimized to develop a system more conducive to effectively and economically oxidize contaminants in ground water. Current plans are to implement a newly developed oxidation technology at pilot- and field-scales and to continue laboratory research involving fundamental processes. Other areas of research have included the compatibility between DNAPLs and bentonite, affects of O_2 on biodegradation of PAHs and PCP in soil, and H_2O_2 as a source of O_2 in bioremediation.

Technology Transfer - Dr. Huling has organized and assisted in the implementation of conferences, training seminars, technical meetings, symposiums, short courses, and workshops, and has been responsible for publication of technology transfer documents including Issue Papers, journal articles, research reports, projects reports, solutions manuals, technical abstracts, etc.

Ph: 580-436-8610; Fax 580-436-8614;
huling.scott@epa.gov.



[Back to Technical Assistance & Technology Transfer Branch](#)

This page is maintained by Dan West (Computer Sciences Corporation) at NRMRL - Subsurface Protection & Remediation Division, Ada, OK.

*Comments, suggestions, or questions about these pages may be sent to:
[Dan West, west.daniel@epa.gov](mailto:Dan.West.west.daniel@epa.gov)
or to the EPA Coordinator:*

The excerpt below provides an explanation of the proprietary product called HRC found at this web site: "<http://www.groundwaterremediation.com>" other similar non-proprietary products be used to treat the contaminants of concern. Rob Sanchez, RPM March 20, 2002

Bioremediation Using Hydrogen Release Compound (HRC®)

Hydrogen Release Compound (HRC®) is an innovative and unique product, which is used to stimulate rapid degradation of chlorinated solvent contaminants often found in groundwater and soil. It has been applied to treat compounds such as perchloroethene and trichloroethene on sites across the US and has demonstrated breakthrough results. HRC has been shown to achieve rapid in situ degradation of target contamination without the costs and disruption associated with complex engineered remediation systems and without the ongoing cost and liability of natural attenuation approaches. HRC is a proven, technically sound and very cost effective technology.

HRC is a proprietary, environmentally safe, food quality, polylactate ester specially formulated for slow release of lactic acid upon hydration. The HRC is simply applied to the subsurface via push-point injection or within dedicated wells. The HRC is then left in place where it passively works to stimulate rapid contaminant degradation.

The process by which HRC operates is a rather complex series of chemical and biologically mediated reactions. Initially, when in contact with subsurface moisture, the HRC slowly releases lactic acid. Indigenous anaerobic microbes (such as acetogens) metabolize the lactic acid producing consistent low concentrations of dissolved hydrogen. The resulting hydrogen is then used by other subsurface microbes (reductive dehalogenators) to strip the solvent molecules of their chlorine atoms and allow for further biological degradation. When in the subsurface, HRC continues to operate in this fashion for a period of a years time, cost effectively degrading a wide range of chlorinated aliphatic hydrocarbons (CAHs) including common groundwater pollutants such as PCE, TCE, TCA as well as their daughter products.